

# OLIVE GROWING

SCIENTIFIC EDITORS

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5<sup>th</sup>  
EDITION

[1st ENGLISH EDITION]

CO-EDITED





## **OLIVE GROWING**



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# OLIVE GROWING

**1st English edition of the 5th revised  
and enlarged edition of EL CULTIVO DEL OLIVO**

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## PREFACE

This new English edition of *Olive Growing* was developed by the Rural Industries Research and Development Corporation and the Australian Olive Association in Australia as a translation and update of the fifth edition of the Spanish manual. It is intended as a definitive reference source for the Australian olive industry and will also be an asset for olive producers and processors in other English speaking countries.

The first four Spanish editions went out of print. Both the number of editions and the number of books sold since 1997 are unprecedented in Spanish agricultural literature. Furthermore, this has become one of the Spanish language publications most quoted in international scientific publications. It has now become a reference in the olive world.

Most of the authors have updated their chapters and, in some cases, enlarged upon the original text. This edition is an attempt to include new developments in knowledge that have occurred in the relevant chapters since the fourth edition. Here again, this is the result of an effort to maintain the currency of the book, and its usefulness for the readers.

This book gathers in 20 chapters the experience of a large number of scientists and experts from various public institutions. Their work published here is a compendium of substantive progress achieved in olive groves over the past 20 years.

Professionals from the olive farming and industry sectors, technical experts, students and the general public with an interest in olive groves, will find current information on relevant aspects of olive trees as oil producers, on how to control production, on the diversity of varieties used and their characteristics, on propagation of this plant, on the establishment of new plantations, on how to manage the crop in order to maximise water and nutrient usage and to avoid the loss of non renewable natural resources, on how to protect the crop from pests, diseases and

competitors and how to harvest the olives. Finally, readers will find information on new methods for processing olive oil and table olives, and on the criteria defining olive oil quality for consumption and health.

We would like to thank these knowledgeable colleagues for their input. It is their contribution that has made this work possible. The information has been organised in a logical manner and avoiding unnecessary repetitions, while respecting the authors' texts. Last but not least, we trust this book will be of interest to our readers. It has been edited in the hope that they will find it both useful and enjoyable.





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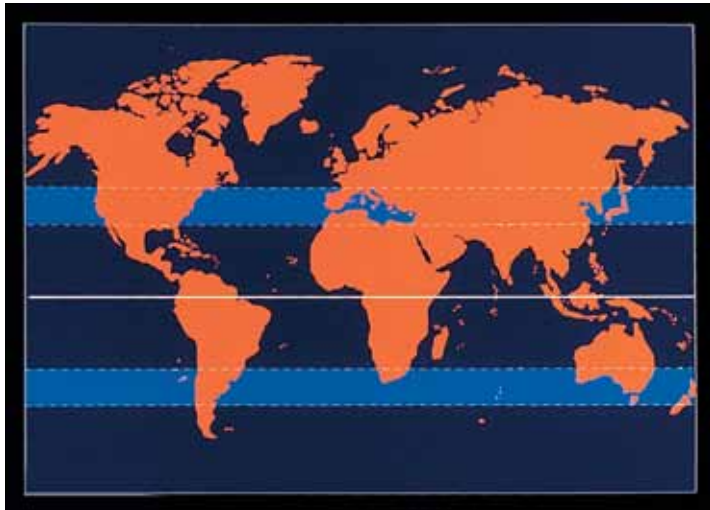
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## CHAPTER 1

# **OLIVE GROWING IN THE WORLD AND IN SPAIN**



Luis CIVANTOS

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## **1. Geographic distribution of olive groves**

Olive trees originated in an area extending from the southern Caucasus to the highlands of Iran, Palestine and the coastal area of Syria. Olive growing advanced via Cyprus towards Anatolia, and to Egypt through Crete, until it became established in all Mediterranean countries. From the fifteenth century, transoceanic voyages of Columbus, Magellan and Juan Sebastián Elcano helped olives reach and spread throughout the New World. Olives are currently grown also in South Africa, China, Japan and Australia.

### **1.1. Olive trees in the world**

The habitat of the olive tree is centred around 30° and 45° latitude, both in the northern and southern hemispheres; in Mediterranean climate regions characterised by dry and hot summers. In the southern hemisphere, olive groves are found in more tropical latitudes with altitude-modified climates.

Current olive groves are estimated at approximately 960 million olive trees, of which approximately 945 million—approximately 98% of the total—are found in the Mediterranean basin countries where they cover 9.5 million hectares. Table 1.1 shows the olive tree inventory for the main olive growing countries by continent (IOC, 2003; Oliarea and Olistat, 1998 and 1999).

Approximately 50 million olive trees are under irrigation, but dryland crops dominate.

Furthermore, the average annual production is 14 million tonnes of olives, of which 90% are used for oil production and 10% for table olives.

### **1.2. Olive trees in Spain**

In Spain there are olive groves in almost every area of the country, making it the world's largest producer of olives. The only non-producing regions in Spain are the Autonomous Communities of Galicia, Asturias and Cantabria. The latest Ministry

of Agriculture statistics show that the area under olive groves in Spain has reached 2,405,837 hectares (MAPA, 2003), with the breakdown detailed in Table 1.2.

TABLE 1.1  
*Geographic distribution of the olive industry in the world*

<i>Country</i>	<i>N. of olive trees (000)</i>	<i>Area (hectares)</i>
Algiers	16,700	168,000
Angola	40	400
Libya	8,000	197,000
Morocco	58,000	550,000
Egypt	4,500	47,000
Tunisia	63,000	1,580,000
South Africa	200	2,000
Argentina	6,000	45,000
Brazil	100	1,000
Chile	560	6,000
United States	1,750	14,500
Mexico	1,000	12,500
Peru	560	5,605
Uruguay	316	1,000
Afghanistan	1,000	
China	1,600	10,000
Cyprus	2,500	9,500
Iraq	750	10,000
Iran	380	5,355
Israel	2,500	20,000
Jordan	10,000	100,000
Lebanon	8,000	50,000
Palestine	10,500	85,000
Syria	54,500	480,000
Turkey	68,000	595,000
European Union: *		
Spain	308,700	2,424,000
France	2,500	39,500
Greece	120,000	1,026,000
Italy	160,000	1,431,000
Portugal	35,000	529,000
Albania	5,500	45,000
Malta	23	200
Serbia and Montenegro	500	3,600
Croatia	2,600	19,000
Slovenia	150	1,000
Australia	1,900	18,700
New Zealand	230	2,300
Total World	957,559	9,534,160
Mediterranean Basin	942,343	9,415,555

Source: \*Datos Olistat Oliarea (EC, 1998 and 1999)

TABLE 1.2  
Area under olive trees in Spain. Year 2000

Purpose	Area (hectares)				
	In production	Not producing	Total	Dryland	Irrigated
Oil	2,087,974	143,576	2,231,550	1,944,913	231,999
Table olives	164,713	9,574	174,287	134,918	24,659
Total	2,252,687	153,150	2,405,837	2,079,831	326,006

Source: Food and Agriculture Statistical Data Yearbook. Year 2003 (MAPA).

The purpose of the European Commission's study was to determine the existing olive groves in the EU using a sampling system (Oliarea, 1999); the results showed an olive growing area of 2,423,841 hectares for Spain.

In 1964 olive groves were estimated at 2,360,000 hectares and in 1988 they had dropped to 2,087,000 hectares, with an annual decrease rate of 11,400 hectares. However, since 1988 there has been an upward trend at the rate of 26,500 hectares/year between 1988 and 2000 (Figure 1.1). The rate of new plantings has intensified over the last few years. Estimates based on the data published by the MAPA (2000) and obtained in the survey on the area under cultivation, indicate that in 2000 Spain had approximately 400,000 hectares of olive groves up to 12 years old (Civantos, 2000).

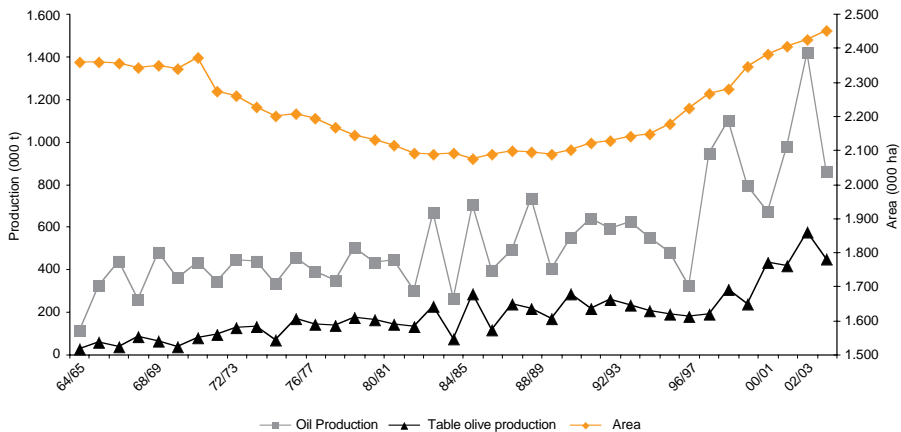


Figure 1.1. Spanish olive area and production.

It is possible to gain an insight into the changes of olive growing areas by Autonomous Community over several years, by comparing 1943, 1963 (year of the maximum area), 1983 and 2000 holdings as shown in Table 1.3.

In *Andalusia*, where 62% of the country's olive groves are located, the area is still increasing, despite major sections having been removed in the 1970s to be replaced by pastures, particularly in Seville. New plantations established in Jaén, Córdoba, and Granada as well as in Seville, on olive-suitable lands, have compensated for that decrease. Currently there are 250,000 hectares more than in 1964.

In *Extremadura* the area under olive trees has shown a slight but continuous increase. The net increase in area during this period was 79,000 hectares.

In *Castilla-La Mancha* the maximum area recorded was in the 1960s. Climate limitations were the main reason behind the reduction recorded between 1964 and 1983, although the current area is similar to the one under olive trees in 1943.

The olive groves in *Catalonia*, *Aragón* and the *Murcia* region have been reduced by half with respect to 1963 figures, as a result of the removal of old plantations and plantations situated in unsuitable lands. New plantings in Murcia since 1983 have reversed the trend for this region.

TABLE 1.3  
*Olive groves by Autonomous Community*  
(in thousands of hectares)

<i>Autonomous Communities</i>	<i>Years</i>			
	<i>1943</i>	<i>1963</i>	<i>1983</i>	<i>2000</i>
Andalusia	1,099	1,238	1,208	1,490
Castilla-La Mancha	309	349	287	312
Extremadura	194	230	252	273
Catalonia	209	219	128	127
Valencia	144	132	93	98
Aragón	98	91	56	58
Murcia	31	30	11	20
Madrid	21	27	22	21
Balearic	22	17	14	7
Castilla y León	11	14	12	7
Navarra	10	11	4	3
La Rioja	6	7	3	3
Basque Country	1	1		*

\* Under 500 hectares. Based on Agricultural Statistics Yearbook data. Ministry of Agriculture, Fisheries and Food/MAPA.

The *Valencia* Community also recorded a decrease in olive holdings during this period, although the drop has been less pronounced compared to other regions, and holdings have remained stable since 1983.

The olive area has not changed in *Madrid* and it has recorded a slight drop in *Castilla y León*.

The *Balearic Islands*, *La Rioja*, *Navarra* and the *Basque Country* are devoting decreasing areas to olive groves.

### 1.3. Spain's olive growing areas

With respect to production characteristics, Spain can be divided in ten zones as follows (Ministry of Agriculture, 1972):

*Zone 1: Picual.* The 'Picual' variety dominates the entire province of Jaén, the north of the province of Granada (Iznalloz region) and the east of the province of Córdoba (Bujalance region). Olive groves cover approximately 700,000 hectares; production is very high and is used to make highly stable oil with high oleic acid and polyphenol content (Humanes and Civantos, 1993). The *Sierra de Segura*, *Sierra Mágina*, *Sierra de Cazorla* and *Montes de Granada* Designation of Origin areas are found in this region.

*Zone 2: Hojiblanco.* Characterised by the 'Hojiblanca' variety, although in some areas the 'Picual', 'Carrasqueña de Córdoba' or 'Picudo', 'Chorrúo' and other varieties are also relatively important in this zone.

This area of approximately 430,000 hectares covers most of the province of Córdoba (with the exception of the Bujalance and La Carlota regions), the Estepa region in Seville, the Loja region in Granada and the Antequera region in Málaga.

This zone includes the *Baena* and *Priego de Córdoba* Designations of Origin, which owe their character to the 'Picudo' variety. They cover 37,500 hectares and 29,000 hectares respectively.

'Hojiblanca' is a double purpose variety as it is used for table olives, particularly black olives; however, a major portion of the harvest is used to produce good quality oils which are much appreciated on the Spanish market.

*Zone 3: Western Andalusia.* Olive holdings of 230,000 hectares cover the entire Cadiz and Huelva provinces, and parts of Seville province (excluding Estepa) and the La Carlota region in Córdoba. The dominant oil variety is 'Lechin de Sevilla' as well as 'Hojiblanco', 'Verdial de Huévar', 'Manzanilla Serrana', etc. The 'Manzanillo' and 'Gordal Sevillana' table olive groves are very important here; both varieties produce high quality fruit. The oils produced with 'Lechin de Sevilla' are much appreciated. This zone includes the *Sierra de Cádiz* Designation of Origin region.

*Zone 4: Eastern Andalusia.* This zone covers the province of Almería, parts of Granada province (excluding the Iznalloz region) and parts of Málaga province (excluding the Antequera region). The main varieties grown in this zone are 'Lechin de Granada', 'Verdial de Vélez-Málaga', 'Aloreña' and 'Picual de Almería'. Olive groves are estimated at 120,000 hectares. 'Verdial de Vélez-Málaga' can produce extraordinary quality oils. The Designation of Origin *Poniente de Granada* is located in this area.

*Zone 5: West.* This includes the two provinces of Extremadura and the Avila, Salamanca and Zamora production areas. Here olive groves are situated at the head of the Tiétar Valley and on the banks of the Duero River, close to Portugal.

The main varieties in the 280,000 hectares of olive farms are ‘Manzanilla Cacereña’, ‘Manzanilla’ or ‘Carrasqueña de Badajoz’, ‘Morisca’, ‘Verdial de Badajoz’ and ‘Cornicabra’. The first two varieties are suitable for table olive production: ‘Cacereña’ is used for black olives while ‘Carrasqueña’ is used for green olives. *Sierras de Gata-Las Hurdes* in Cáceres and *Aceite de Monterrubio* in Badajoz are Designations of Origin of this region.

*Zone 6: Centre.* This includes 330,000 hectares of olive groves in the Autonomous Communities of Castilla-La Mancha and Madrid. The main variety in this zone is ‘Cornicabra’ as well as ‘Castellana’, ‘Alfajara’ and ‘Gordal de Hellín’. ‘Cornicabra’ produces highly prestigious oils that are in great demand in Catalonia and also in Italy. The Designation of Origin *Montes de Toledo* is found in this zone.

*Zone 7: Levante.* This zone covers the provinces of Murcia, Alicante and Javier, with olive groves on approximately 85,000 hectares. Here we find a large mosaic of varieties including ‘Blanqueta’, ‘Villalonga’, ‘Changlot Real’, ‘Lechin de Granada’, ‘Cornicabra’, and others.

*Zone 8: Ebro Valley.* This zone includes Aragón, La Rioja, Navarra and Álava. The most widespread variety is ‘Empeltre’ while ‘Verdeña’, ‘Farga’, ‘Royal de Calatayud’ and others are also found, depending on the area. The olive holdings cover a decreasing area of 65,000 hectares. High quality oils are produced here, particularly those from Bajo Aragón, which are fruity early in the season and grow sweeter and more aromatic as the season advances. The *Bajo Aragón* Designation of Origin is found in this region.

*Zone 9: Tortosa-Castellón.* This zone consists of Bajo Ebro-Montsiá de Tarragona, and the province of Castellón, with approximately 85,000 hectares of ‘Farga’, ‘Morrut’, ‘Sevillena’, ‘Empeltre’ and other varieties. Production here is used for oils which are of good quality provided fly attacks are controlled and fresh fruit are used with suitable techniques. The *Baix Ebre-Montsiá* Designation of Origin is found in this area.

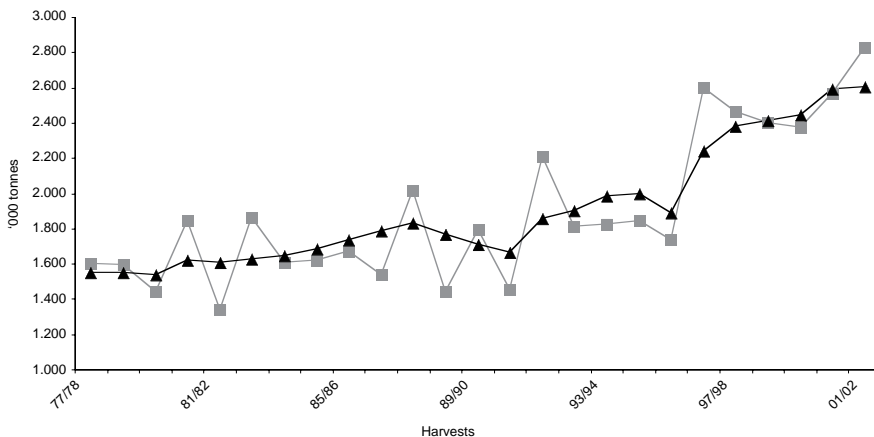
*Zone 10: Arbequina.* This zone covers Catalonia, excluding Bajo Ebro-Montsiá, and the Balearic Islands. Besides ‘Arbequina’—after which the region is named—, we also find ‘Verdiell’, ‘Empeltre’, ‘Argudell’ and other varieties. The olive groves cover approximately 80,000 hectares. The Designations of Origin *Les Garrigues*, *Siurana* and *Terra Alta* in Catalonia and *Aceite de Mallorca* in the Balearic Islands, are found in this zone. They produce high quality oils which are fruity at the start of the season and sweet after the first frosts; these are in very high demand for direct consumption and also for blending with other olive oils.

## 2. Olive oil

### 2.1. Global overview

Figure 1.2 shows world olive oil production for the years between 1977/78 and 2001/02 (IOC, 2003). The highest and lowest productions were recorded in 2001/02 and 1981/82 with 2.8 million tonnes and 1.3 million tonnes respectively. The world production is growing at an annual rate of 46,800 tonnes. This trend has led to estimates of a mean production figure of 2.5 million tonnes for 2006/07.

Consumption variations (IOC, 2003) are lower than production variations, and range between 1.5 million tonnes in 1979/80 and 2.6 million tonnes in 2001/02. Consumption is growing at a rate of 45,500 tonnes/year; this trend would take mean consumption figures for 2007 to 2.48 million tonnes. It is interesting to note that production and consumption are balanced: each important increase in mean production leads to a similar increase in consumption.



**Figure 1.2. World olive oil production and consumption.**

Table 1.4 shows production and consumption for the main olive producing countries, for harvesting seasons between 1981/82 and 2001/02, using mean annual figures for those periods. It also shows trade between the 1991/92 and 2001/02 harvests, using mean annual figures for those periods (IOC, 2003). The European Union is the top producer (78%), consumer (71%) and exporter (58%).

The international olive oil trade is dominated by the European Union which is the largest exporter; it also imports most of the oil that Tunisia, the second exporter (24%), exports to the world.

TABLE 1.4  
*World Olive Oil Overview*  
 (mean annual figures in thousands of tonnes)

<i>Countries</i>	<i>Mean annual production</i>				<i>Mean annual consumption</i>			
	<i>1981/85</i>	<i>1986/90</i>	<i>1991/95</i>	<i>1996/01</i>	<i>1981/85</i>	<i>1986/90</i>	<i>1991/95</i>	<i>1996/01</i>
EU	1,288	1,275	1,450	1,977	1,259	1,306	1,406	1,739
Tunisia	99	116	153	159	51	46	51	53
Turkey	81	76	73	120	70	52	54	72
Syria	51	62	72	108	59	58	72	92
Morocco	27	41	42	63	27	36	41	53
Algiers	14	12	31	34	14	14	27	36
Jordan	8	9	12	18	10	11	16	18
Libya	9	7	7	7	51	40	10	10
Argentina	8	9	9	9	3	4	4	7
USA	1	1	2	1	34	69	103	163
Other countries	25	40	33	25	84	117	144	201
Total world	1,611	1,648	1,884	2,521	1,662	1,753	1,928	2,444

<i>Countries</i>	<i>Mean annual exports</i>		<i>Mean annual imports</i>	
	<i>1991/95</i>	<i>1996/01</i>	<i>1991/95</i>	<i>1996/01</i>
EU	*173	*262	*128	*129
Tunisia	103	106	0	0
Turkey	20	50	0	0
Syria	3	5	0	0
Morocco	4	10	2	2
Algiers	0	0	0	0
Jordan	1	1	6	1
Libya	0	0	3	3
Argentina	5	6	0	4
USA	6	5	107	168
Other countries	6	5	110	167
Total world	321	450	356	474

\* Only non-Community.

The main producing countries, including the European Union Member States, are:

Spain	39%	Syria	4%
Italy	22%	Morocco	2%
Greece	16%	Portugal	2%
Tunisia	6%	Algiers	1%
Turkey	5%	Jordan	1%

The main consumer countries, including the European Union Member States, are:

Italy	29%	France	3%
Spain	22%	Turkey	3%
Greece	10%	Portugal	3%
United States	7%	Tunisia	2%
Syria	4%	Morocco	2%

The main importer is the USA, with 35% of the total volume of imports.

## 2.2. Olive oil overview in the EU

As indicated above, since early 1986, with the entry of Spain and Portugal, the EU has dominated the world olive oil sector. In view of the importance of this fact, it is timely to compare the evolution of the olive industry in the European Union Member States between the period prior to 1986 and later years.

Table 1.5 compares the mean annual production and mean annual consumption of olive oil for the 1981/82 to 1985/86, 1986/87 to 1990/91, 1991/92 to 1995/96 and 1996/97 to 2001/02 harvests. Mean production ranges from 1.29 to 1.98 million tonnes. Spain took over from Italy as the largest producer after the first period. Other than that, the situation did not change for the rest of the countries. The mean annual consumption increased from 1.26 to 1.74 million tonnes. The figures for each country did not vary, with the exception of Spain, where consumption increased considerably after joining the EU. Also noteworthy are the proportional increases recorded in France and in non-EU Member States.

TABLE 1.5  
*Mean olive oil production and consumption in the EU*  
(mean annual figures in thousands of tonnes)

<i>Member States</i>	<i>Annual Production</i>				<i>Annual Consumption</i>			
	<i>1981/85</i>	<i>1986/90</i>	<i>1991/95</i>	<i>1996/01</i>	<i>1981/85</i>	<i>1986/90</i>	<i>1991/95</i>	<i>1996/01</i>
Germany	0	0	0	0	4	7	13	30
France	2	2	3	3	25	27	42	80
Italy	528	425	528	549	630	629	658	709
United Kingdom	0	0	0	0	2	6	14	30
Greece	256	253	418	408	202	206	207	255
Spain	466	563	892	978	357	395	407	544
Portugal	37	32	39	39	37	34	54	64
Others	0	0	0	0	2	3	10	27
Total EU	1,289	1,275	1,450	1,977	1,259	1,307	1,406	1,739

European Union Member States' mean exports of olive oil during 1986/87 to 1990/91, 1991/92 to 1995/96 and 1996/97 to 2001/02 are shown in Table 1.6. Of note among the internal trade figures are the exports from Spain and Greece, to Italy and France, mainly of bulk oils. Exports to other economic areas are basically oils packed under a brand name (90% of exports); Riviera type oils (refined olive oil blended with virgin olive oil) dominate this market. Italy exports a higher proportion of virgin olive oil than Spain.

TABLE 1.6  
*EU Producer Country Olive Oil Exports*  
 (mean annual figures in thousands of tonnes)

<i>Member States</i>	<i>1986/90</i>		<i>1991/95</i>		<i>1996/01</i>	
	<i>All</i>	<i>Non-Community</i>	<i>All</i>	<i>Non-Community</i>	<i>All</i>	<i>Non-Community</i>
Spain	240	47	191	55	*238	83
Italy	94	68	145	96	*185	153
Greece	77	6	130	10	*116	8
France	11	1	14	1	*21	1
Portugal	12	6	11	10	*5	16
Remainder	28	1	4	1	*1	0
Total EU	461	128	494	173	*756	261

\* 1996 and 1997

### 2.3. Spanish production

Spain is the main olive oil producer and only Italy has overtaken it, producing more olive oil for short periods of time. Figure 1.1 shows olive oil production from 1964/65 to 2002/03. At the beginning of this chapter we referred to the decrease in olive grove area, particularly between 1964 and 1988. Despite this, production has continued to increase over the entire period, with peak production reaching 1,413,500 tonnes in 2000/01 and the lowest production being recorded in 1964 with 110,000 tonnes. Mean annual production trends for a five-year period ranged from 370,000 tonnes at the beginning of the period to 940,000 tonnes in 2002–03. Production increased at a rate of 24,700 tonnes each year, between 1981 and 2003.

The contrast between decreasing areas until 1984 and increasing production shows that Spanish olive holdings have undergone a renewal leading to increased productivity. Old plantings and other groves that were located in unsuitable lands—either because of the soil types or because of climate limitations—were pulled out in the 1960s and 1970s, and were replaced by more suitable or profitable crops for those sites and times. Simultaneously, the Spanish Government set up an Olive Grove Reconversion and Production Restructuring Plan (MAPA, 1988), to encourage activities to improve or increase specialised olive grove productivity. Alternatives were sought for unproductive olive groves in an effort to increase profitability by associating them with other compatible crops or by streamlining crop operations to reduce costs. In areas more suited to olives, high density plantings were encouraged with a view to intensive olive growing.

This led to a decrease in the number of olive groves in less suitable regions, and to increased plantings and even higher yields in areas with a greater suitability for growing olives.

This is confirmed by the changes in olive oil production in the various Autonomous Communities; Table 1.7 shows mean annual production figures for the periods between 1962/63 and 2002/03 (MAPA, 1962 to 2003).

There was a major increase in production in the 1997/02 period as a result of the 1997/98 and 2001/02 harvests, which were historically the highest.

In *Andalusia*, with 62% of the area and 82% of production, the harvests increased continuously over this period.

In *Castilla-La Mancha* there was a strong increase during the last five-year period when mean production nearly doubled previous figures. In *Extremadura* there were slight increases throughout these periods.

TABLE 1.7  
*Spanish olive oil production by Autonomous Community*  
(annual mean figures in thousands of tonnes)

<i>Autonomous Communities</i>	<i>Harvests</i>							
	1962/66	1967/71	1972/76	1977/81	1982/86	1987/91	1992/96	1997/02
Andalusia	243	287	304	313	395	463	470	795
Castilla-La Mancha	32	31	37	31	44	44	38	65
Extremadura	19	22	21	19	25	29	23	35
Catalonia	24	24	18	17	17	18	22	32
Valencia region	12	13	17	12	12	15	15	21
Aragón	9	9	7	6	5	7	6	10
Murcia region	2	2	2	2	1	2	3	5
Madrid	3	3	3	3	3	2	2	3
Balearic Islands	2	1	1		*	*	*	*
Castilla y León	1	1	1	1	1	2	2	1
Navarra	2	1	1	1	1	1	1	1
La Rioja	1	1	*	*	*	*	*	*
Basque Country	*	*	*		*	*	*	*

\* Less than 1,000 t.

The decrease in area recorded in *Catalonia* led to a sharp drop in production in the 1972/76 five-year period, followed by an upward trend; currently, mean production figures are double those of 1985. This also applies to the *Valencia* region and to *Murcia*.

In *Aragón*, production recovered slightly during the last five years, whilst in *Madrid*, *Castilla y León*, *La Rioja*, *Balearic Islands* and the *Basque Country* production stagnated or dropped.

After studying production and its trends in the Autonomous Communities, it may be interesting to focus on the changes in the eight major producer provinces during the same period of time, as shown in Table 1.8. Spanish production is very much influenced by the contribution of Andalusia which in turn, is influenced by the production of Jaén and Córdoba. Production increased continuously in both Jaén and Córdoba at rates of 8,800 t/year and 3,500 t/year respectively. Despite the fact that increments in Granada and Málaga were not as high, with rates of 1,700 t/year and 1,000 t/year respectively, they are also noteworthy. Seville is different, since

the considerable reduction in olive grove area caused a drop in olive oil production between 1962 and 1980; this was followed by a recovery which became quite evident in the last five years. The provinces of Badajoz, Toledo and Ciudad Real all show very similar production profiles, with production remaining stagnant between 1962 and 1981 and increasing thereafter. Mean growth rates were 450 t/year for Badajoz and Toledo and 370 t/year for Ciudad Real.

TABLE 1.8  
*Spanish olive oil production: main producer provinces*  
(annual mean figures for the periods in thousands of tonnes)

<i>Provinces</i>	<i>Harvests</i>							
	1962/66	1967/71	1972/76	1977/81	1982/86	1987/91	1992/96	1997/02
Jaén	105	149	140	164	206	248	231	413
Córdoba	64	71	76	75	96	111	124	187
Granada	13	12	24	19	29	41	42	74
Malaga	17	13	18	23	27	29	35	52
Seville	35	32	36	25	29	26	25	55
Badajoz	12	14	14	13	19	22	16	27
Toledo	11	12	17	14	19	19	17	27
Ciudad Real	12	12	14	10	16	18	17	25

### 3. Table olives

Of olive production, 10% is utilised for direct consumption, i.e. olives are processed as table olives in any of the numerous modes that have been conceived over the years. Many of these are traditional methods of certain regions and in some cases, they only have a local market, while in others they have been widely distributed and have gone beyond national borders: green, black or various colour olives; in brine, dehydrated, in dry salt or seasoned; whole, grated, pureed, pitted or stuffed; cut in half, quartered, sliced or in strips, etc.

#### 3.1. Global overview

Table olive production is over 1,200,000 tonnes and, as in the case of olive oil, the European Union is the largest producer with 43% of world production. Table 1.9 shows production, consumption and trade figures for major countries or economic areas, for the annual average of the periods included between the 1981/82 and 2001/02 harvests.

The main table olive producing countries, including the European Union Member States, are:

Spain	31%	Greece	7%
Turkey	12%	Egypt	5%
USA.	8%	Italy	5%
Syria	7%	Argentina	2%
Morocco	7%	Jordan	2%

Consumer countries, including European Member States, include:

USA	15%	Egypt	4%
Spain	12%	Brazil	4%
Turkey	11%	France	3%
Italy	10%	Germany	2%
Syria	7%	Argentina	2%

Major exporter countries include the European Union (Spain with 41% and Greece with 9%), Morocco (20%), Argentina (10%) and Turkey (8%). The main importers in the world include: USA (29%), Brazil (15%), France (8%), Canada (7%), Saudi Arabia (5%) and Russia (5%). For Member States of the European Union only non-Community imports and exports have been included.

TABLE 1.9  
*World Overview for Table Olives*  
(mean annual figures in thousands of tonnes)

<i>States</i>	<i>Mean Annual Production</i>			<i>Mean Annual Consumption</i>		
	<i>1986/90</i>	<i>1991/95</i>	<i>1996/01</i>	<i>1986/90</i>	<i>1991/95</i>	<i>1996/01</i>
Algiers	6	14	28	6	14	27
Argentina	44	39	45	15	16	15
EU	395	388	553	301	350	410
Jordan	9	10	22	9	12	21
Morocco	70	84	88	24	34	23
Syria	57	71	92	59	74	82
Tunisia	10	12	12	9	11	12
Turkey	104	122	156	101	108	127
USA	84	96	104	159	165	184
Libya	2	3	3	9	5	5
Egypt	17	48	68	19	43	51
Others	73	15	87	150	160	249
World total	871	965	1,258	861	991	1,206

<i>States</i>	<i>Mean annual exports</i>			<i>Mean annual imports</i>		
	<i>1986/90</i>	<i>1991/95</i>	<i>1996/01</i>	<i>1986/90</i>	<i>1991/95</i>	<i>1996/01</i>
Algiers	29	24	32			2
Argentina		176	*174	97	125	*53
EU	186	2	1	1	3	
Jordan	2					
Morocco	40	55	65			
Syria			5			
Tunisia	1		1			
Turkey	6	18	27			
USA	2	5	5	76	73	93
Libya				7	1	2
Egypt		4	9	2	1	1
Others	6	12	11	81	94	172
World Total	268	296	*330	264	296	*323

\*Only non-Community.

### 3.2. Table olives in Spain

Spanish production of table olives between the 1964/65 and 2002/03 harvesting seasons ranged from 25,500 tonnes in 1964/65 to 575,000 tonnes in 2001/02. In the early 1980s, the mean annual production was 150,000 tonnes, but at present this has increased to 420,000 tonnes. Figure 1.1 shows Spanish table olive harvests.

The main producing areas are Andalusia (Seville, Córdoba, Malaga and Huelva) with 79% of the country's production, and Extremadura (Badajoz and Cáceres) with 20%. Commercially, the more traditional processing method used in Spain—and the one requiring the largest quantities of olives—is what is known as the *Sevillian style*; there are also numerous other specialty preparations which are typical of each region. In the 1970s, and because of the demand from Eastern European countries, *black olives in brine* were prepared, which were later practically replaced by *Californian oxidated black style olives*. Currently, 75% of the Spanish production is used for green olives, 20% for *Californian black style olives*, and the balance 5% for *natural black olives in brine* or *in acetic acid*, and for various local styles (Garrido, 1994).

Spanish table olive exports (within and outside the European Community) have strengthened: they grew from 122,000 tonnes in 1983/88 to 132,000 tonnes in the next five-year period and then to 138,000 tonnes in 1994 to 1996. Current exports have reached 244,000 tonnes, and they are exported to over 100 countries; in total, 168,000 tonnes leave the EU.

## 4. Future prospects

Global olive-growing area has increased slowly but constantly over the second half of the twentieth century and early twenty-first century. This crop has a very long cycle; onset of production takes time, and so does achieving peak production, while production drop is also a long process. In certain countries the expansion of olive culture has been encouraged, such as in Algiers, Tunisia and Morocco in the 1970s or more recently in Syria and Argentina. In the European Union, new plantings have been established in Spain, Greece and more recently in Portugal through a development scheme for this crop (1998). Production increases are due more to improvements in horticultural practices than to an expansion in the olive growing area.

As shown in Figure 1.2, production and consumption trends are keeping a remarkable balance at around 2.5 million tonnes, for early twenty-first century figures. Production is not very flexible, so it is not easy to expand in the short term; this has put a stop to export expansion policies. As a result, a slight harvest surplus has led to a campaign to encourage further consumption and greater access to new olive oil markets.

A group of producer countries, including Algiers, Israel and Lebanon, tailors domestic consumption to the volume of the harvest; Jordan, Syria and Morocco also follow this policy to some extent. Resulting production increases translate into an increase of their own consumption that is potentially higher, but domestic economic conditions limit consumption increases.

Another group of producer countries consumes part of its production, and exports the balance. Consumption capacity is greater but the economy does not encourage the purchase of a product which is more expensive than its competitors. Tunisia is the typical example of this; its olive oil exports have a strong impact on its balance of trade. Higher standards of living in these countries should lead to an increased consumption of olive oil.

In European Union Member States producers, consumption of olive oil increased considerably over the 1980s and this tendency is still ongoing. Spain's consumption has improved quite noticeably since its entry into the EU, with a yearly average of 544,000 tonnes for the 1996/97 to 2001/02 harvests.

Consumption is increasing year after year in non-producer Member States that traditionally consume little olive oil. This is a similar situation to that of the United States, Canada and Japan. Due to higher income levels and a greater concern for the impact of diet on health and life expectancy, the population is sensitive to information campaigns on a diet based on healthy foods. As a result, olive oil has been promoted as a natural product extracted from olives by mechanical means, and which is beneficial for the digestive system and particularly for the prevention of cardiovascular diseases. Thus, consumption in the United States has gone from 25,000 tonnes twenty-five years ago to an expected 200,000 tonnes for 2002/03, and continental Europe markets might respond in a similar fashion.

There is also a balance between world production and consumption of table olives. When there is a bumper crop of varieties suitable for table olives, part of the crop is used to produce olive oil thus applying a natural surplus regulation process; this, however, does not entail an overload of the olive oil market.

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*Olive Growing is a technical manual for all those involved in the olive growing sector, i.e. growers, processors, technical experts, students and, in general, all those with an interest in growing this ancient plant.*

*The scientific editors have designed this book as a collection of works, involving scientists and technical experts intricately linked to the crop, as well as experts in the subject matter of their assigned chapter. The aim was for them to present in a simple and clear manner, all aspects pertaining to their subject, combining the breakthroughs of the last 25 years with practical suggestions and recommendations that would help readers plant and grow an olive grove successfully, enabling them to obtain quality products in the light of current knowhow and future estimates.*

*The scientific editors' goal has been fully achieved, if we are to judge from the swift sale of the first four Spanish editions, now out of print, an exceptional feat for an agricultural book. To date, no other text on Spanish agriculture has been distributed so widely in such a short time.*

*This new English edition of Olive Growing was developed by the Rural Industries Research and Development Corporation and the Australian Olive Association in Australia as a translation and update of the fifth edition of the Spanish manual. It is intended as a definitive reference source for the Australian olive industry and will also be an asset for olive producers and processors in other English speaking countries.*

